

What is claimed is:

1. A therapy infusion apparatus for delivery of therapeutic fluid to a patient, said apparatus comprising:

- a) a flexible therapy bag,
- b) a movable surface which can apply force to an outside surface of said therapy bag to increase fluid pressure within said therapy bag,
- c) an exit port in said therapy bag which will allow fluid to exit in a delivery direction from said flexible therapy bag under pressure,
- d) an adjustable, fluid control element located along said delivery direction, after said exit port.

2. The therapy infusion apparatus of claim 1 wherein said therapy bag has at least one major face which comprises at least 25% of the total surface area of said therapy bag, and said movable surface can be moved into contact with said at least one major surface so that contact between said at least one major surface and said movable surface covers at least 50% of the surface area of said at least one major surface by the time that said movable surface is fully extended.

3. The therapy infusion apparatus of claim 1 wherein said therapy bag comprises at least two fluid flow ports within a fluid control element, one of said ports comprising said exit port, and adjacent to at least one of said ports is an element which has a storage area for a memory unit and access ports for accessing information from said memory unit.

4. The therapy infusion apparatus of claim 3 wherein said memory unit comprises a chip, and the access ports enable electronic connection from an outside memory reading or memory writing apparatus to said chip.

5. The therapy infusion apparatus of claim 4 wherein a chip is present within said storage area, and said chip contains electronically readable information relating to at least two different topics

of information selected from the group consisting of a prescription for the therapeutic material; the name of an active ingredient in the prescription; the chemical name of a prescription carrier; additives in the prescription; volume of the prescription; expiration date; name of a prescribing doctor; name of a private loader; name of a local supplier/manufacturer of ingredients of the prescription; source of at least some materials in the prescription; a name of a therapy bag manufacturer; a name of a pharmacist; a patient name; patient information relating to at least one of age, allergies, address, frequency of prescription refill, weight, chemical intolerances, instructions for a flow control module with respect to desired flow rates; intervals for delivery; rate and volume of delivery; and drip rate.

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6. The therapy infusion apparatus of claim 1 wherein said movable surface comprises an extendable bladder.

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7. The infusion apparatus of claim 6 wherein said bladder is expandable or inflatable by a liquid to move a surface of the bladder against a surface of the therapy bag.

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8. A therapy bag for use in the infusion of liquids to a patient comprising a flexible bag having a storage area and a delivery end, said delivery end comprising at least two fluid ports, at least one port capable of allowing fluid from within said storage area when pressure is applied to liquid within said storage area, and said delivery end also having a storage area for storage of a memory element, said storage area having access ports for electronically accessing said memory element.

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9. The therapy bag of claim 8 wherein said storage area contains a chip and there are electronic access ports oriented in said storage area to allow external electronic access to said chip so that information on said chip may be accessed.

10. The therapy bag of claim 9 wherein said storage area is asymmetrically located along said delivery end.

11. The therapy bag of claim 10 wherein at least two liquid flow ports are located to one side of said asymmetrically located storage area.

5 12. The therapy bag of claim 9 wherein said chip contains electronically readable information relating to at least two different topics selected from the group consisting of the prescription; the name of an active ingredient in the prescription; the chemical name of a prescription carrier; additives in the prescription; volume of the prescription; expiration date; name of a prescribing doctor; name of a private loader; name of a local supplier/manufacturer of ingredients of the prescription; source of at least some materials in the prescription; a name of a therapy bag manufacturer; a name of a pharmacist; a patient name; patient information relating to at least one of age, allergies, address, frequency of prescription refill, weight, chemical intolerances, instructions for a flow control module with respect to desired flow rates; intervals for delivery; rate and volume of delivery; and drip rate.

10 15. The therapy bag of claim 10 wherein said chip contains electronically readable information relating to at least two different topics selected from the group consisting of the prescription; the name of an active ingredient in the prescription; the chemical name of a prescription carrier; additives in the prescription; volume of the prescription; expiration date; name of a prescribing doctor; name of a private loader; name of a local supplier/manufacturer of ingredients of the prescription; source of at least some materials in the prescription; a name of a therapy bag manufacturer; a name of a pharmacist; a patient name; patient information relating to at least one of age, allergies, address, frequency of prescription refill, weight, chemical intolerances, instructions for a flow control module with respect to desired flow rates; intervals for delivery; rate and volume of delivery; and drip rate.

20 25 14. The therapy bag of claim 10 wherein a battery is also present on said therapy bag.

15. The therapy bag of claim 14 wherein said battery provides power at least to the chip.

16. The therapy bag of claim 10 wherein said battery provides power to at least one electrically powered element on said therapy bag selected from the group consisting of a display panel on said therapy bag, a chip, a fluid rate control element, vibratory signal, liquid emitting diode display, and a sound alarm.

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17. The therapy infusion apparatus of claim 1 further comprising
e) a fluid flow detector that determines at least whether therapeutic fluid is flowing through, towards or past the exit port.

10 18. The therapy infusion apparatus of claim 1 further comprising

f) a meter measuring flow rates of the therapeutic liquid within or out of said therapy infusion apparatus.

19. The therapy infusion apparatus of claim 1 further comprising

15 g) an alarm that activates upon malfunctioning or interruption of any defined function of the therapy infusion apparatus during loading of a therapy bag or delivery of therapeutic liquid to a patient or movement of therapeutic liquid within the therapy infusion apparatus.

20 20. The therapy infusion apparatus of Claim 1 further comprising a microcomputer for controlling at least one operating function of said infusion apparatus.

25 21. The therapy infusion apparatus of Claim 4 wherein a memory chip in said infusion therapy apparatus is programmable by an auxiliary computer external to said infusion apparatus, whereby information may be entered for storage in said chip relating to said therapeutic fluid.

22. The therapy infusion apparatus of Claim 2 whereby said a pump is present within said apparatus which pump comprises:

30 a) flexible enclosure member wherein the elements comprising said infusion apparatus are mounted,

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- b) a bladder located in said pump, wherein when said therapy bag is positioned in said pump the surfaces of said therapy bag are substantially in contact with said bladder,
- c) air compressor for inflating said bladder,
- d) pressure transducer for measuring the air pressure in said bladder, and
- e) a vent for controllably venting said bladder.

23. The apparatus of Claim 2 wherein further comprising a meter measuring quantities of therapeutic fluid and said meter comprises:

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- a) a shell having an interior cavity, said cavity having an input port for accepting said medicinal fluid from said therapy bag and an output port for transferring said medicinal fluid out to said patient,
- b) first and second axles parallelly mounted in said cavity,
- c) first and second longitudinally extending rotors,
- 15 d) first and second fixed bar magnets mounted with the axes of said magnets directed along the longitudinal axis of said first rotor, said first rotor having a first cycloidal contour,
- e) third and fourth fixed bar magnets mounted with the axis of said magnets directed along the longitudinal axis of said second rotor, said second rotor having a second cycloidal contour, said first and said second rotors rotatably mounted on said first and said second axles, wherein said longitudinal axis of said first rotor is perpendicular to said longitudinal axis of said second rotor, and a portion of said first cycloidal contour is substantially in contact with a portion of said second cycloidal contour,

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- g) said shell having an interior wall in the shape of a continuous closed curved surface,
- h) said first rotor having a portion of its contour in contact with said wall, said second rotor having a portion of its contour in contact with said wall, wherein a first chamber is formed bounded by said first rotor said second rotor and said wall, and a second chamber is formed bounded by said first

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rotor said second rotor and said wall, said first chamber containing said inlet port and said second chamber containing said outlet port,

i) a reciprocating shuttle proximate said shell, said shuttle comprising movable fifth and sixth magnets, said fifth magnet for interaction with said first and second magnets when said shuttle is actuated to position said fifth magnet to attract said first or said second magnet allowing rotation of said first and said second rotors, and said sixth magnet for interaction with said third and said fourth magnets when said shuttle is actuated to position said sixth magnet to attract said third or said fourth magnet allowing rotation of said first and said second rotors, whereby for each quarter rotation of said first and said second rotors a fixed quantity of medicinal fluid is forced from said second chamber through said outlet port, and j) electromagnetic actuating means for alternately driving said shuttle back and forth, said electromagnetic actuating means under control of said microcomputer.

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24. The infusion apparatus of Claim 23 wherein said outlet port includes a check valve opposing fluid flow back into said cavity.

25. The infusion apparatus of Claim 18 wherein said meter comprises a rate of magnetic field
20 change electrical transducer.

26. The infusion apparatus of Claim 1 wherein and alarm system is activated by a microcomputer responsive to a fluid flowing through said meter.

25 27. The infusion apparatus of claim 26 further comprising either

- h) a display driven by said microcomputer, said display visually indicating any defined apparatus malfunction, or
- b) an audio system driven by said microcomputer aurally indicating any defined apparatus malfunction.

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28. The therapy infusion apparatus of claim 27 further comprising:

- d) alarm information available from said microcomputer as input to a modem for transmission over an external communication line.

5 29. A method of infusing a medicinal fluid to a patient, comprising the steps of:

- a) filling a therapy bag with said medicinal fluid,
- b) recording on a semiconductor EPROM the characteristics of said fluid and the necessary information related to infusing a patient with said fluid,
- c) reading said information from said EPROM by a microcomputer,
- 10 d) generating control signals in accordance with said information by said microcomputer, and
- e) activating a fluid dispensing unit in response to said control signals, whereby said fluid dispensing unit infuses said patient with said medicinal fluid through set tubing in accordance with said recorded information.

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